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An analog of the vaisman-molino cohomology for manifolds modelled on some types of modules over weil algebras and its application

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Abstract

An epimorphism μ : A → B of local Weil algebras induces the functor Tμ from the category of fibered manifolds to itself which assigns to a fibered manifold p : M → N the fibered product pμ : TAN x TBN TBM → TAN. In this paper we show that the manifold TA7V x TBN TBM can be naturally endowed with a structure of an A-smooth manifold modelled on the A-module L = An ⊕ Bm, where n = dim N, n + m = dim M. We extend the functor Tμ to the category of foliated manifolds (M, F). Then we study A-smooth manifolds ML whose foliated structure is locally equivalent to that of TAN x TBN TBM. For such manifolds ML we construct bigraduated cohomology groups which are similar to the bigraduated cohomology groups of foliated manifolds and generalize the bigraduated cohomology groups of A-smooth manifolds modelled on A-modules of the type An. As an application, we express the obstructions for existence of an A-smooth linear connection on ML in terms of the introduced cohomology groups.